

Sea Freight and the Danish Economy

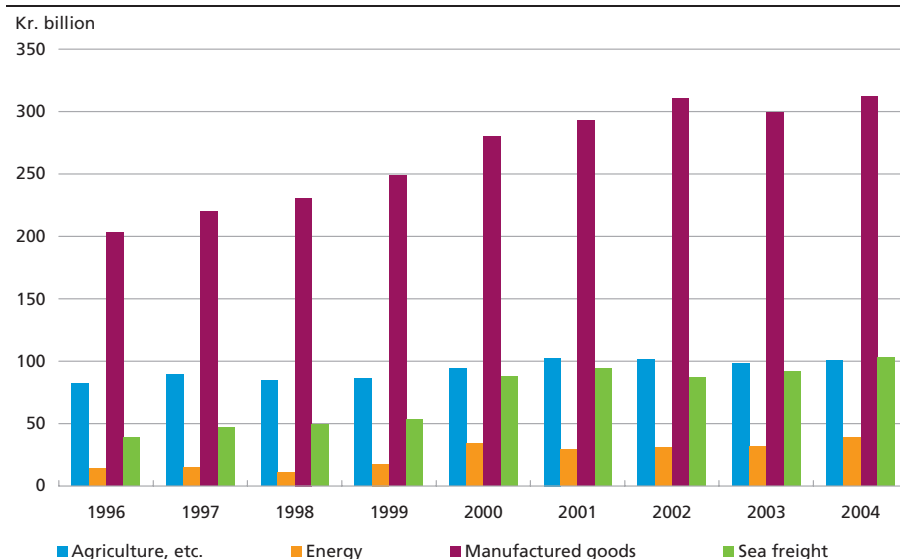
Niels C. Beier and Erik Haller Pedersen, Economics

Danish shipping increasingly contributes to the current-account surplus. Sea freight exports have more than doubled in less than ten years, and shipping is now the second-largest export sector after manufacturing industry, cf. Chart 1. In terms of value creation, i.e. gross value added, it only amounts to just under 15 per cent of manufacturing, however.

Shipping differs from other sectors in a number of significant ways. Typically, vessels do not sail in Danish waters, but mainly transport goods between other countries, e.g. China and the USA. This means that production only requires Danish labour to a limited extent. According to the Danish Maritime Authority the entire shipping sector, known as "Blue Denmark", employs 120,000 people, including derived employment in other sectors such as the offshore oil industry. This article operates with a narrower definition, focusing solely on shipping as such, which employs around 25,000.

DANISH EXPORTS

Chart 1



Note: "Agriculture, etc.", "Energy" and "Manufactured goods" are compiled on the basis of the SITC categorisation in the foreign-trade statistics as, respectively, SITC 0-2 and 4, SITC 3 and SITC 5-9. Other services are not included.

Source: Statistics Denmark, Statbank Denmark.

Revenue is dependent on a number of global conditions, including the international economy, the dollar rate and freight rates, which may vary considerably over time. The freight rates are determined by the world market and are typically settled in dollars. The rest of this article analyses the significance of the sector to the Danish economy. First, there is a brief introduction to international shipping, before attention is turned to Denmark.

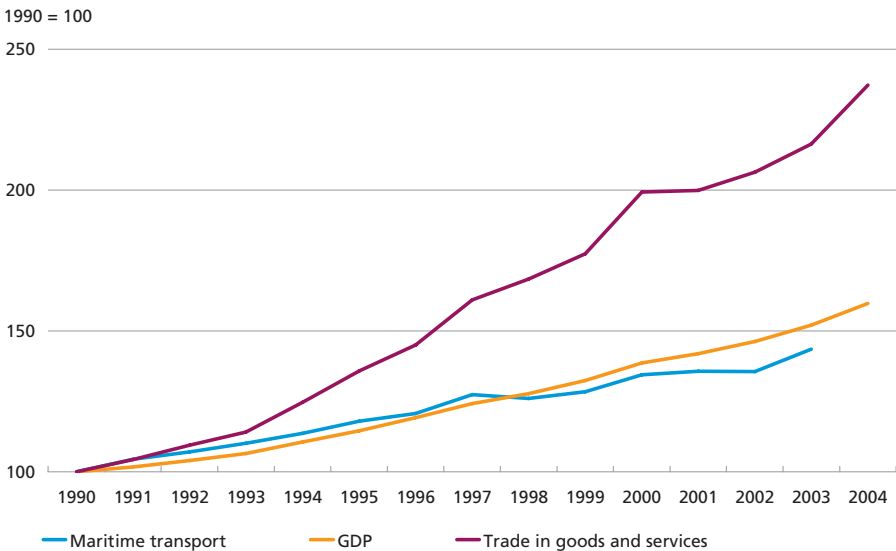
BRIEF INTRODUCTION TO INTERNATIONAL SHIPPING AND TRADE

International trade is a cornerstone of the global economy. Exchange of goods and services between countries on market terms widens the choice of supply and ensures that production takes place where it is cheapest and best. This is currently seen in the increasing integration of China into the global economy, but is also more generally evident from the fact that world trade is growing faster than production, cf. Chart 2.

Trade relies on cheap and secure transport. Shipping plays a key role in this context since an estimated 90 per cent of global trade in goods takes place by ship. As trade grows, the demand for maritime transport also increases, and cheaper transport in turn makes increasing trade more economically attractive. Chart 2 shows the development in maritime transport in tonnage/miles, i.e. the weight of the cargo multiplied

DEVELOPMENT IN MARITIME TRANSPORT, GDP AND INTERNATIONAL TRADE

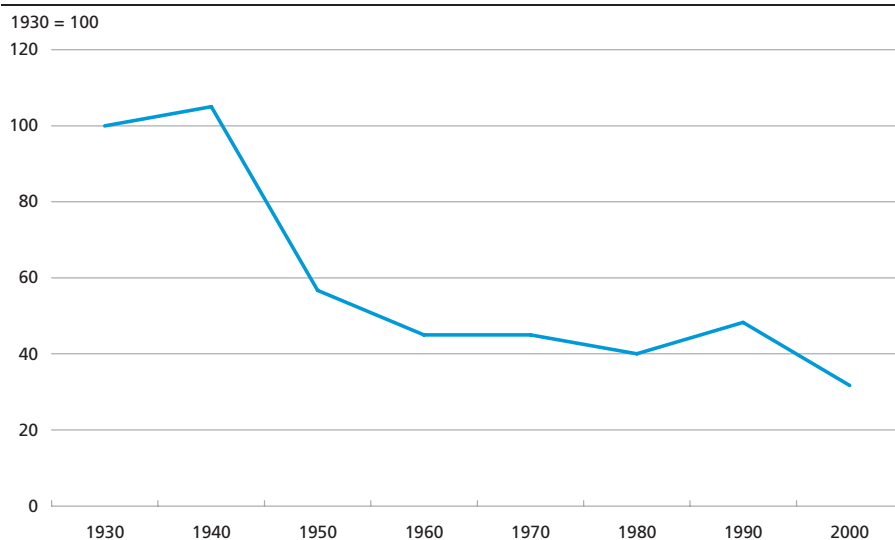
Chart 2



Note: Maritime transport is stated in tonnage/miles. GDP and trade in goods and services are stated in constant prices. Source: IMF, *World Economic Outlook* database and Shipping Statistics, Yearbook 2004.

TRANSPORT COSTS, SEA FREIGHT

Chart 3



Note: 1990 US dollars. Average expenses for freight and port costs (ocean freight) per (short) ton of cargo, cf. Busse (2003). Short ton is a US unit of measure corresponding to just over 900 kg.

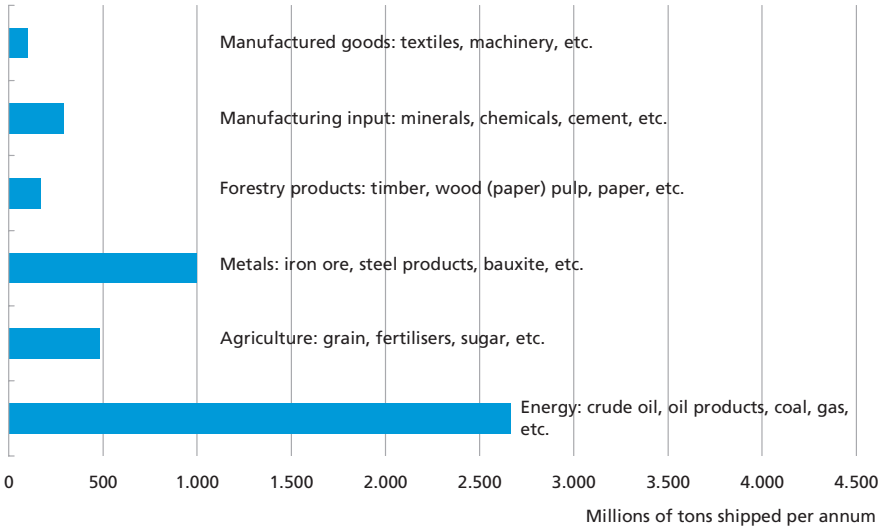
Source: Busse (2003).

by the distance transported. The lower growth rate for maritime transport than for transport in general reflects that the weight of the goods transported increases at a slower rate than their value, due to e.g. increased trade in processed goods such as electronics, medicine, etc.

Technological advances have made maritime transport ever cheaper, cf. Chart 3. Specific improvements within shipping include bulk and container transport, cf. Stopford (1997). Bulk transport means that typically only one homogeneous article, e.g. grain, is transported at any one time, but in large quantities. Container transport involves transporting different goods at the same time, but in standard containers that are easy to load and unload. Another factor contributing to the lower transport costs is that ever larger and more specialised vessels are being built. Moreover, port facilities and cargo loading technologies also have an impact on overall transport costs.¹

As a result of specialisation, shipping today comprises many submarkets, depending on vessel type and cargo, whether or not the vessel is in liner traffic, and whether a vessel is chartered on a short- or long-term basis. Freight rates are therefore determined by supply and demand in the individual submarkets. For instance, a poor harvest in one region,

¹ Stopford (1997) and (2007) provide an economic textbook description of the maritime sector. For further information and explanations, see the websites and publications of the Danish Shipowners' Association, the Danish Maritime Authority and Danish Ship Finance.



Note: Figures relate to 2002.

Source: Updated Chart 1.2 from Martin Stopford (1997).

leading to an increased demand for imported grain, can exert upward pressure on freight rates for grain. Freight rates for liner traffic are often regulated via shipping conferences at which prices are determined. In all the various shipping submarkets, revenue depends on global trade, and settlement typically takes place in dollars.

In terms of weight, commodities account for the greater part of the goods transported by sea, cf. Chart 4. However, industrial products and consumer goods constitute an increasing share, and these articles typically far exceed commodities in value.

Maritime transport primarily takes place to and from Europe and Asia, cf. Table 1. This reflects the openness of the economies, as well as the

GEOGRAPHICAL DISTRIBUTION OF EXPORTS AND IMPORTS USING MARITIME TRANSPORT

Table 1

	Exports, global percentage	Imports, global percentage
North America	8	15
Europe	25	34
Asia	19	38
South America	13	6
Africa	9	3
Rest of world	25	3
Total maritime transport	100	100

Note.: The Table shows the percentages of, respectively, exports and imports in millions of tons transported by sea in 2002. Details may not add due to rounding.

Source: Updated Table 8.1 from Martin Stopford (1997).

increased integration of Asia into the global economy. A case in point is China, which joined the World Trade Organisation, WTO, in 2001.

THE SHIPPING SECTOR

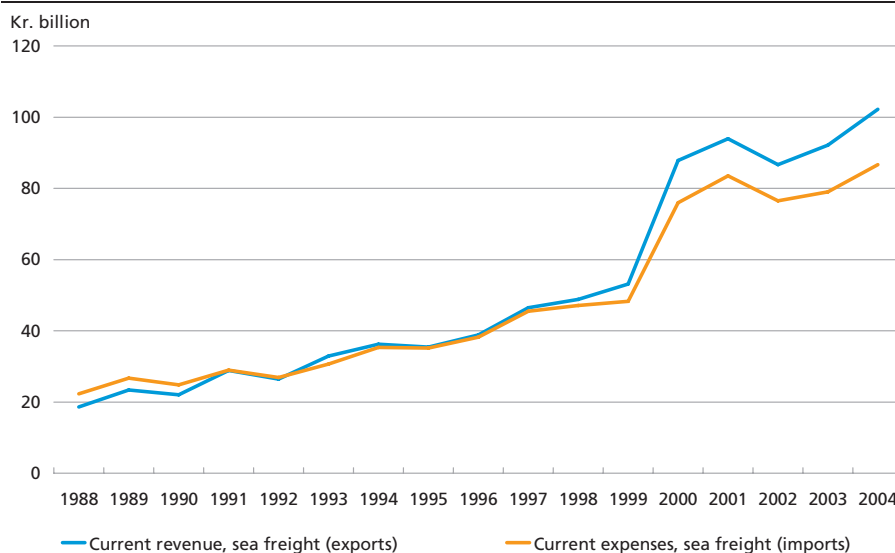
Denmark operates one of the world's largest merchant fleets, especially with regard to container ships, cf. Box 1. Sea freight of goods accounts for an increasing share of Danish export revenue, and the sector's contribution to the current-account surplus has been rising, cf. Chart 5.

Shipping production mainly comprises exports earned by sailing between foreign ports, often by vessels under foreign flag. Only around 5 per cent of the revenue relates to sailing to and from Denmark (Danish Shipowners' Association, 2005b). The Danish shipping sector operates far more ships than it directly owns. This means that much of the sector's production comprises logistics services – rather than shipping as such – which are relatively high up in the value chain.

For sea freight to be included in Danish exports, the enterprise organising the freight must be domiciled in Denmark, while the payer must be domiciled abroad. A Danish enterprise organising container transport from e.g. China to the USA for a Dutch enterprise will be exporting Danish sea freight to the Netherlands as the importer of the sea freight. In the opposite situation, Denmark is importing sea freight. If a Danish

EXPORTS AND IMPORTS OF SEA FREIGHT, BALANCE-OF-PAYMENTS STATISTICS

Chart 5



Note: Annual observations.

Source: Statistics Denmark, Statbank Denmark.

THE DANISH MERCHANT FLEET IN BRIEF

Box 1

According to the Danish Shipowners' Association (2005a), Danish shipping controls approximately 7 per cent of the global tonnage or 40 million GT (gross tons).¹ Only around 30 per cent is directly owned by Danish shipping companies. In terms of nationality of ownership, Denmark is the world's 12th largest maritime nation, but if all vessels operated are included, Denmark is in the top 5. Of the directly owned vessels only just over half are registered in Denmark – typically in the Danish International Register of Shipping (DIS) – and these comprise approximately 1¼ per cent of the total global tonnage, cf. Table 2. Danish ships primarily operating internationally can be registered in DIS.

Danish shipping is particularly strong in the container sector, cf. Tables 2 and 3. The primary reason is that the world's largest container shipping company, Maersk-Sealand, operates more than 12 per cent of the total global TEU capacity (i.e. number of standard 20-foot containers). This figure will rise to 18 per cent with the acquisition of P&O Nedlloyd. Two thirds of the Danish-registered tonnage is in liner traffic, i.e. sails between certain ports to a fixed schedule.

With an average vessel age of 6.7 years, the Danish merchant fleet is among the youngest in the world. The global average is 12 years. As of 1 January 2005, Danish shipping companies had submitted orders for 180 new vessels totalling 8.5 million GT at an aggregate newbuilding value of more than kr. 60 billion (Danish Shipowners' Association, 2005b). The average age of the merchant fleet is thus likely to fall in the coming years, while the development in tonnage will depend on whether the older vessels are sold to others.

COMPOSITION OF THE GLOBAL MERCHANT FLEET

Table 2

	Number of vessels	Tonnage	TEU '000	DK's share
Total	39,665	598,783	8,597	1.3
Tankers	10,032	215,539	...	0.9
Bulk carriers (large dry cargo ships/bulk cargo)	5,977	180,227	219	0.1
Container ships	3,036	85,176	6,424	5.4
Cargo ships (small dry cargo ships/general cargo) ..	12,895	50,750	1,504	0.4
Others	7,725	67,091	450	1.3

Note: "Tonnage" is measured in 1,000 GT (gross tons). "DK's share" shows the share of Danish-registered ships as a percentage of the global tonnage. "Others" comprise passenger ships, reefer ships and special ships.

Source: Danish Shipowners' Association (2005a).

THE 5 LARGEST CONTAINER SHIPPING COMPANIES WORLDWIDE

Table 3

	Home country	Number of ships	TEU capacity
A.P. Moller Group.....	Denmark	346	900,509
MSC	Switzerland	237	618,025
Evergreen Group	Taiwan	151	437,618
P&O Nedlloyd ²	UK/Netherlands	158	426,996
CMA-CGM Group	France	178	373,191

Note: TEU capacity states the number of standard 20-foot containers. The figures for the largest shipping companies are from end-2004.

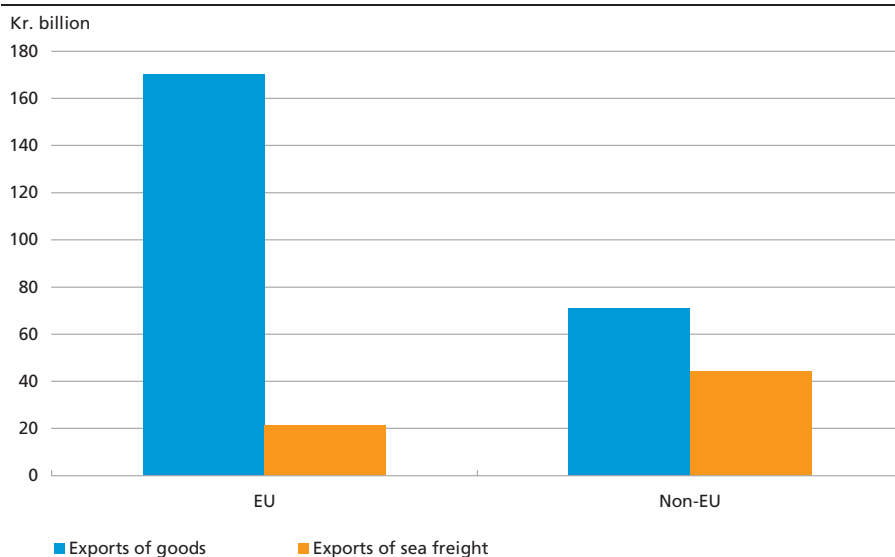
Source: Review of Maritime Transport (2005).

¹ Tonnage can be compiled in various ways. Gross tons is a cubic measure stating the closed space in the vessel. Deadweight tons is a vessel's loading capacity, i.e. with maximum cargo and fuel. For container ships, the TEU capacity indicates the number of standard 20-foot containers the ship will carry.

² Acquired by the AP Moller Group in 2005.

EXPORTS IN 1ST HALF OF 2005 BY COUNTRY

Chart 6



Note: Exports of goods comprise all categories, i.e. agriculture, etc., energy and manufactured goods. Other services are not included. EU comprises all 25 EU member states.

Source: Statistics Denmark, Statbank Denmark.

ship is chartered by a foreign shipowner, sea freight is exported, while charter of a foreign ship by a Danish enterprise counts as import of sea freight.

The shipping sector is decidedly global in its orientation. Whereas most Danish exports of goods are to the EU member states, this does not apply to sea freight, cf. Chart 6.

The high export earnings are to a lesser extent reflected in value creation, i.e. production value less the value of the input of raw materials, cf. Table 4. The export value of sea freight comprises around one third of the export value of manufactured products, but the value added is only 15 per cent.

PRODUCTION STRUCTURE IN SHIPPING AND MANUFACTURING INDUSTRY

Table 4

Kr. million	Shipping	Percentage	Manu- facturing	Percentage
1. Production value	112,448		530,567	
2. Value of input	90,055		354,766	
3. Gross value added (1-2) and (4+5)	22,393	100	175,801	100
4. Payroll costs	4,648	21	128,405	73
5. Gross profit	17,745	79	47,396	27

Note: 2004 figures. Production taxes are included in "gross profits".

Source: Statistics Denmark, Statbank Denmark and ADAM databank.

Almost 2 per cent of the economy's total value added is attributable to shipping. This sector nevertheless receives considerable attention due to the large export share and perhaps the relatively few, large players, of which one, Maersk-Sealand, is part of Denmark's largest corporation, the A.P. Moller Group.

However, sea freight is also influenced by the compilation method, which means that the services items of the balance of payments and the value added in some cases "leap" when a Danish shipping company acquires a foreign competitor. This is the case if the acquired activity is consolidated for accounting purposes. If so, the acquired activity is perceived in statistical terms as having been transferred from production in its home country to production in Denmark. An example is the acquisition of Sealand by Maersk in December 1999, when both the registered Danish value added and – especially – exports and imports rose substantially, cf. Charts 5 and 7. An even greater leap can be expected in connection with the acquisition of P&O Nedlloyd by Maersk-Sealand if the former is consolidated for accounting purposes. P&O Nedlloyd is more than twice as large as Sealand prior to the merger with Maersk in 1999.

Unlike maritime transport, land-based activities such as industrial production create added value in the country where they take place, irrespective of ownership. Consequently, production by foreign industrial corporations under Danish ownership has no impact on Danish added value, and the balance of payments is only affected via the profits of these enterprises, i.e. by a net figure. In the case of a shipping company, the balance of payments is affected via exports and imports of services.

If, on the other hand, a Danish shipping company treats an acquired foreign shipping company as a subsidiary, the acquired activities are not regarded as Danish production.

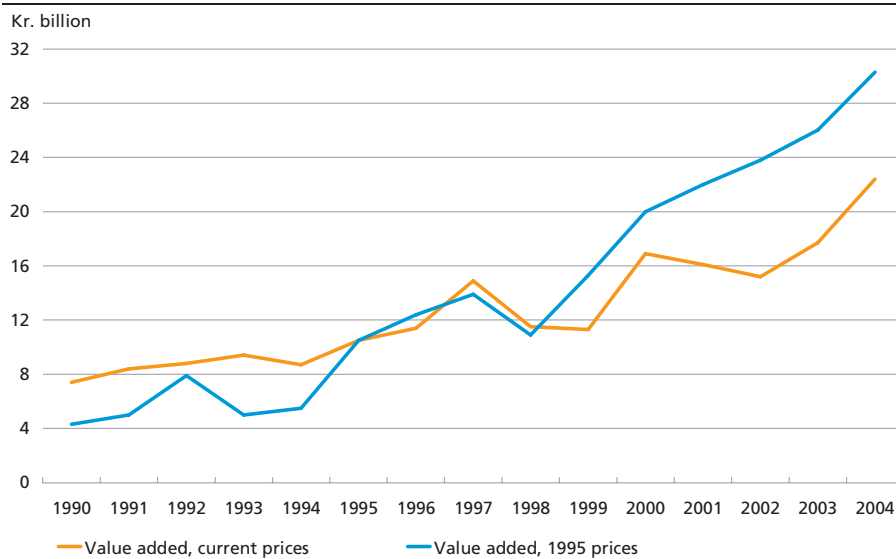
Shipping is far more capital intensive than industry. Value added per employee is substantially higher. While payroll costs in 2004 accounted for 21 per cent of value added in shipping, the equivalent figure was 73 per cent for manufacturing industry on average, cf. Table 4. In recent years, net profits after return on capital invested and payroll costs have been extraordinarily high as a result of high freight rates.

As Chart 7 illustrates, volumes have risen considerably over time, while prices were stagnant up through the 1990s. This is seen from the fact that value added in current prices has not kept up with value added in constant prices. Against the background of higher growth in the global economy, the development in prices has, however, reversed in the last couple of years.

Narrowly defined, employment in shipping is approximately 25,000 (Danish Shipowners' Association, 2005b), compared to around 1.7 million

VALUED ADDED IN SHIPPING

Chart 7



Source: ADAM databank.

in the entire private sector. The narrow definition comprises crew members and employees of the shipping companies. A wider definition that also comprises ports, suppliers of equipment and services, places of education, maritime services and offshore oil and gas activities, brings total employment in "Blue Denmark" up to 7 per cent of employment in the private sector, or around 120,000, according to the Danish Maritime Authority. This figure includes derived employment in other sectors. This article focuses on the narrower definition, shipping, where the marginal employment effect of extra production is presumably small since production to a large extent comprises logistics services and not sailing as such, cf. above.

With respect to taxation, special conditions apply. Instead of corporate tax, shipping companies may opt for tonnage tax, a kind of excise duty based on vessel tonnage. The tax is independent of whether the enterprise is making a profit or not, and of depreciation and write-offs. This ensures that investments are made on the basis of commercial, not taxation, interests.

According to the Danish Shipowners' Association, tax revenue from the shipping sector is in the range of kr. 200 million annually. Employees on ships registered with DIS (the Danish International Register of Shipping) are as a main rule exempt from tax so that the shipowners can pay them on a net basis. In addition, foreigners may be employed on local wage and salary terms. Employees in Denmark are liable to income tax like

everyone else. All in all, direct tax payments are therefore limited, but the considerable derived activity created by the sector yields tax revenues.

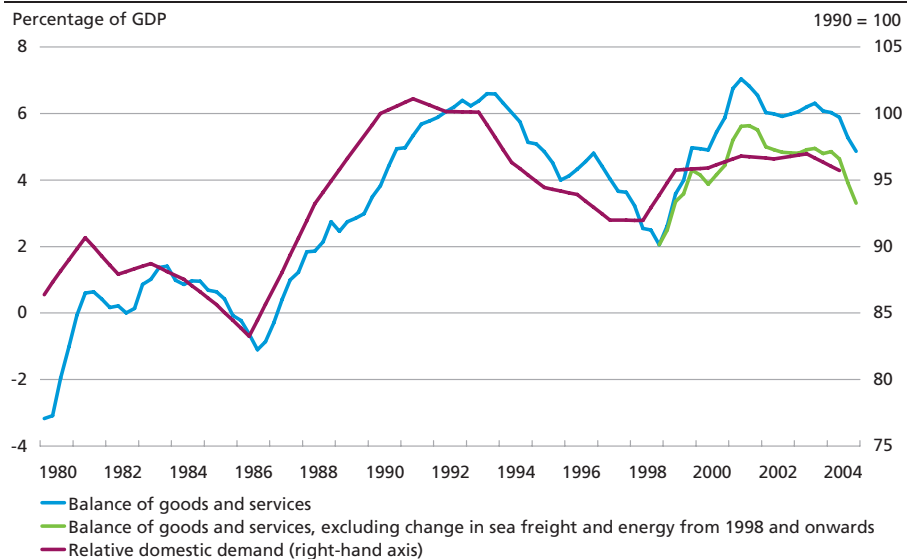
The relatively low tax on shipping reflects that it is very easy to move production abroad. The tax situation is therefore a key precondition for the expansion seen in this sector in Denmark. This is emphasised by a certain degree of reflagging of ships to Denmark in recent years, which is especially significant to the use of Danish labour.

SHIPPING AND THE DANISH ECONOMY

The immediate impact of the increased export of maritime transport has been an improvement of the balance of payments. Consequently, the historical link between economic activity abroad and in Denmark and the surplus of the balance of goods and services has to some extent been broken, cf. Chart 8. In periods with high Danish demand compared to abroad, the surplus diminishes since part of the consumption and investment demand is covered by imports, and vice versa. This was the case in the early 1990s when a weak Danish economy and a booming German economy after reunification resulted in a higher Danish surplus, which then gradually diminished as demand rose in Denmark and fell in Germany. The increase in exports of maritime transport around 2000

THE RELATIONSHIP BETWEEN DOMESTIC DEMAND ABROAD AND IN DENMARK, AND THE BALANCE OF GOODS AND SERVICES

Chart 8



Note: "Relative domestic demand" shows domestic demand (i.e. consumption and investments) abroad, i.e. in the largest OECD countries, in relation to domestic demand in Denmark. The balance of goods and services is a 4th quarter moving average (seasonally adjusted annual levels). The last observation is the 4th quarter of 2004.

Source: Mona databank, OECD *Economic Outlook* No. 77 and own calculations.

contributed to a higher surplus, even though Danish domestic demand was in line with demand abroad.

A number of other factors have also contributed to the large external trade surpluses seen in recent years. For instance, Denmark has become a net exporter of oil since the late 1990s. As Chart 8 shows, the relationship between domestic demand abroad and in Denmark matches the balance of goods and services more closely when energy and sea freight are excluded. For a more detailed description of the development in the balance of payments, see Beier and Pedersen (2005) and Pedersen (2003).

Recent years have seen a different overall pattern than previously, so that the balance of goods and services is now at a higher level for a given relative domestic demand. It is important to emphasise that the reason for the shift in level is not only higher export revenue, but also that the increased revenue has not led to an equivalent rise in consumption and investment so far. It should also be mentioned that to the extent that Danish shipping companies are under foreign ownership, any operating profits are reflected in higher dividend payments to abroad, which has a negative impact on the interest and dividend item of the current account.

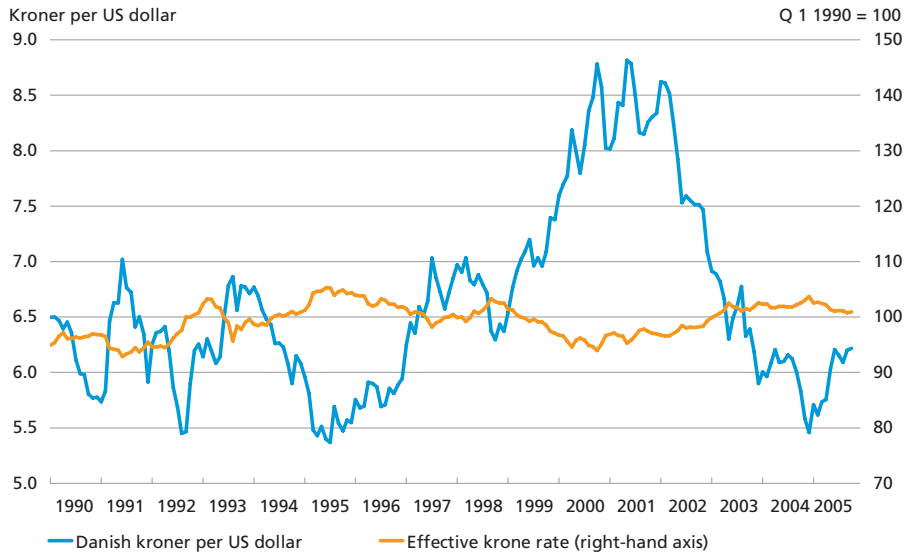
A key element of the increased export of sea freight has been that it only requires Danish labour to a limited extent, so that the expansion of shipping has only generated limited pressure on domestic capacity. As a consequence, the balance of goods and services – and thereby the balance of payments – as a capacity indicator has changed since the late 1990s. Capacity problems – i.e. an emerging shortage of labour – occur at a higher level of the balance of payments than before. This is seen in the current situation of the balance of payments showing a sound surplus, even though the Danish economy is in an upswing and unemployment is low.¹

While exports of goods are highly dependent on the EU economy and less exposed to exchange-rate fluctuation due to the fixed-exchange-rate regime, this does not apply to shipping. Here, revenue is influenced by international cyclical conditions in an even broader sense since most revenue is generated outside the EU. Furthermore, settlement takes place in dollars, and as Chart 9 shows, the dollar rate – and thus export revenue in kroner – fluctuates considerably from year to year. The shipping companies' total dollar exposure is smaller since expenses are typically also settled in dollars, but overall the dollar exposure does point to more volatile profits denominated in kroner.

¹ When the balance of payments was last at the current level, it was a typical recession surplus with a private-sector savings surplus and a public-sector savings deficit. Currently there is a small private-sector deficit and a public-sector surplus.

KRONER EXCHANGE RATES

Chart 9



Note: Monthly series, month-end. The most recent observation is from October 2005.
Source: Danmarks Nationalbank and EcoWin.

Export revenues in the shipping sector are highly dependent on freight rates, which are determined by, *inter alia*, the interaction between the global supply of tonnage in the various submarkets, demand factors such as the global economy, and structural trade conditions such as increased trade with Asia.¹ Since shipbuilding is a lengthy and costly process, there tends to be some global sluggishness on the supply side. As a result, prices – i.e. freight rates and thereby revenue in the sector – can vary substantially from year to year. Likewise, the trend may differ from one submarket to another, cf. Charts 11 and 12, which show a selection of different freight rates. Generally, freight rates have been very high in 2004 and the 1st half of 2005.

Finally, it should be mentioned that new balance of payments statistics were introduced at the turn of the year. In the new compilation, the surplus on the balance of goods and services seems to be higher than previously, partly as a result of large trade surpluses for sea freight. The new balance of payments statistics are outlined in Box 2.

The data break causes uncertainty as to the exact size of the surplus, but there are indications that the surplus may have been larger than statistics so far have shown. In any case sea freight has become an

¹ It is also worth noting that the surplus from trade in sea freight is mainly determined by the *level* of the cyclical position of the international economy (level effect), while the surplus from other goods and services is determined by the *difference* between the cyclical position in Denmark and internationally.

SEA FREIGHT IN THE BALANCE-OF-PAYMENTS STATISTICS

Box 2

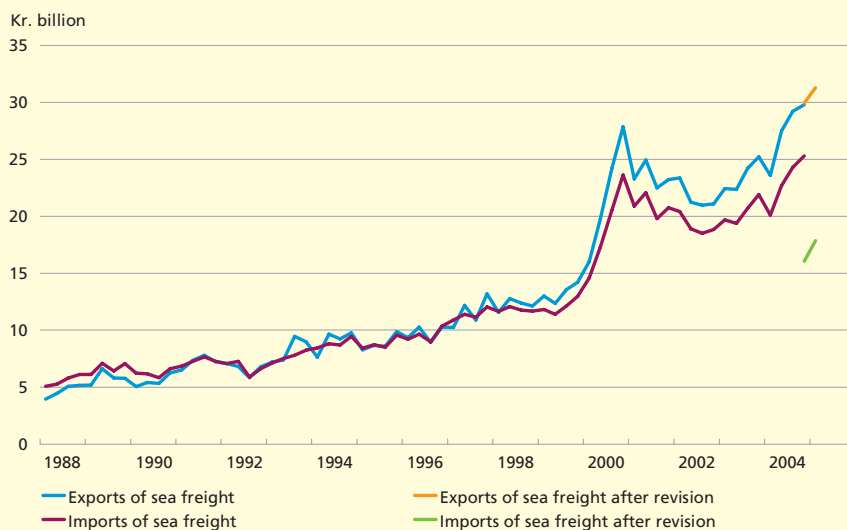
At the turn of the year 2004/2005, the Danish balance-of-payments statistics were re-organised. Among other things, this affected the compilation of sea freight, which was previously stated on the basis of the shipping company statistics. The shipowners now report directly to Statistics Denmark via questionnaires. In the longer term, the new source material will make it possible to compile external trade in sea freight and other services with a greater level of detail and a better geographical breakdown.

The first balance of payments compiled according to the new method was published in the spring of 2005. Data for the 4th quarter of 2004 has been compiled according to both methods. The quarterly figures show that imports of sea freight have declined under the new compilation method, cf. Chart 10.

Assessed on the basis of the monthly figures for the balance of payments, for which the level of detail is lower and data for sea freight is not published separately, a certain revision can be expected in connection with the publication of the quarterly balance of payments in December.¹ Overall, the new compilation method means that retrospective comparisons are subject to uncertainty.

EXPORTS AND IMPORTS OF SEA FREIGHT

Chart 10



Note: Quarterly figures.

Source: Statistics Denmark, Statbank Denmark as at 1 November 2005.

¹ Cf. e.g. Statistics Denmark, *Nyt* No. 432.

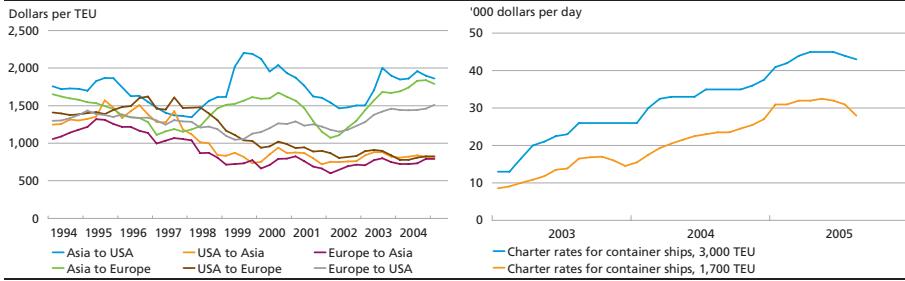
increasingly important share of total Danish imports and exports of goods and services.

FUTURE DEVELOPMENT

In recent years, Danish shipping has benefited from relatively high growth in global trade, especially in view of the increasing integration

CONTAINER SHIPS: GROSS REVENUE PER CONTAINER, AND CHARTER RATES

Chart 11



Note: The left-hand chart shows gross revenue in dollars per standard container.
 Source: Danish Ship Finance and the Danish Shipowners' Association.

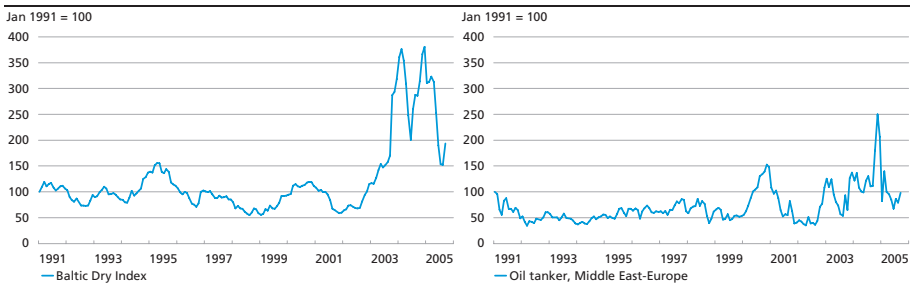
of Asia into the global economy. Combined with sluggish global supply of new ships, this has buoyed up freight rates in dollar terms, cf. Charts 11 and 12. At the same time, the Danish merchant fleet has expanded considerably via newbuilding and chartering of foreign vessels, as well as acquisitions of foreign shipping companies. Denmark has thus increased its market share in an expanding market.

Looking forward, the Danish fleet appears to be set for strong further growth. This is a result partly of Maersk-Sealand's acquisition of P&O Nedlloyd, and partly of the historically large Danish newbuilding programme. However, this is not a purely Danish phenomenon, cf. Table 5.

In the container shipping market, which is particularly important for Denmark, ships on order at 1 January 2005 corresponded to an increase in global capacity by almost 50 per cent. A similar tendency, albeit at a slightly lower level, is seen for other vessel types. This will inevitably exert downward pressure on freight rates as the new ships are launched. Indications to this effect have been seen during the last six months. Whether the decline in freight rates will continue, however, depends

FREIGHT RATES FOR DRY CARGO SHIPS AND OIL TANKERS

Chart 12



Note: There are many freight rates, reflecting the highly segmented market. Not all freight rate statistics are readily available.
 Source: EcoWin.

NEWBUILDING ORDERS BY VESSEL TYPES, 1 JANUARY 2005

Table 5

'000 tons deadweight	Worldwide	Denmark	Global newbuilding orders, percentage of global fleet
Container ships	44,487	5,783	49
Tankers	97,014	5,044	30
Bulk carriers	61,827	288	21
Other	5,328	73	...

Note: Tons deadweight is a measure of the vessel's cargo carrying capacity.

Source: Danish Shipowners' Association (2005a) and Shipping Statistics Yearbook 2004.

entirely on the interaction with demand, i.e. the development in global trade.

Overall, shipping has expanded substantially in recent years, which is primarily reflected in a higher current-account surplus. In terms of value added, the sector constitutes a smaller part of the economy. Finally, it is important to bear in mind that the higher current-account surplus does not entail any significant change in the total capacity of the economy.

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